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(54) **RECOVERY AND PURIFICATION OF GASES USED IN MEDICAL PROCESSES**

(75) Inventors: Jeffrey J. Spiegelman, La Jolla; Daniel Alvarez, Jr., San Diego; Peter K. Shogren, San Diego; Joshua T. Cook, San Diego, all of CA (US)

(73) Assignee: Aeronex, Inc., San Diego, CA (US)

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Primary Examiner—John G. Weiss

Assistant Examiner—Joseph F. Weiss, Jr.

(74) Attorney, Agent, or Firm—Brown Martin Haller & McClain

(57) **ABSTRACT**

A method is disclosed for providing a pure gas for use medical procedures in which the gas is contaminated with other gases during the procedure, and then separating the contaminants and recovering and reusing the decontaminated gas. The method is most advantageously used in medical imaging processes, such as magnetic resonance image (MRI), where hyperpolarized image enhancing noble gases, notably He³ or Xe¹²⁹, are used for image enhancement in brain and lung imaging, and in which the contaminants are normally the exhalant gases from the imaged patient. The contaminated gas is passed through a series of drying and purification steps to remove the exhalant gases and separate the gas. The purified gas is then recovered and stored for reuse. This system prevents the loss of significant amounts of the image enhancing gases, which is important since key gases such as He³ and Xe¹²⁹ are rare and expensive, and (especially He³) permanently lost once vented. Recovery of medical process gases such as those including isotopes of carbon, fluorine or phosphorus is also contemplated. High quality MR images of lung structures and processes and of brain functions can be obtained using the purified gases from this process.

42 Claims, 1 Drawing Sheet

